(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: **03170101 A**

(43) Date of publication of application: **23.07.91**

(51) Int. Cl **A43B 10/00**
A43B 13/22
B05D 1/06
// B32B 5/16

(21) Application number: **01311568**

(22) Date of filing: **30.11.89**

(71) Applicant: **ACHILLES CORP**

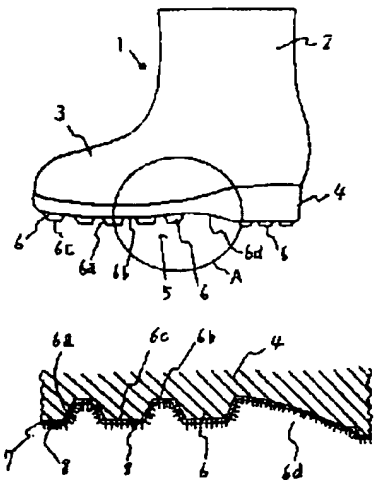
(72) Inventor: **KUBOTA HIROHIKO**

(54) PRODUCTION OF ANTISLIPPING FOOTWEAR SOLE

(57) Abstract:

PURPOSE: To synergistically enhance an antislipping effect by applying an adhesive agent layer on the ground contact surface of the footwear sole and bringing short fibers or fine grains into collision against the adhesive agent layer by an electrostatic flocking method thereby fixing the fibers or grains.

CONSTITUTION: Boots 1 made from PVC are molded by a slush molding method. The boots 1 consist of a body part 2, an upper part 3 and a sole part 4 as the footwear sole. An antislipping design 6 consisting of rugged patterns is applied on the ground contact surface 5 of the sole part 4. This sole part 4 is coated with the adhesive agent over the entire surface thereof. A solvent type of a polyester urethane adhesive agent is used for the adhesive agent and is uniformly applied by spraying on the ground contact surface 5 to form the thin adhesive agent layer 7. After this adhesive agent layer 7 is applied, the short fibers 8 consisting of glass fibers are brought into collision against the adhesive agent layer by the electrostatic flocking method, by which the short fibers are fixed and implanted. The short fibers 8 are implanted approximately perpendicularly to the coated surface of the adhesive agent layer 7, side wall surfaces 6a and the upper base surfaces 6b, lower base surfaces 6c and recessed surfaces 6d.



⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　平3−170101

⑤1Int.Cl.⁵		識別記号	庁内整理番号
A 43 B	10/00	101 C	6617−4F
	13/22	B	6617−4F
B 05 D	1/06		6122−4F
// B 32 B	5/16		7016−4F

⑬公開　平成3年(1991)7月23日

審査請求　未請求　請求項の数 2　(全4頁)

⑤4発明の名称　防滑性履物底の製造法

⑳特　願　平1−311568
㉒出　願　平1(1989)11月30日

⑦2発明者　久保田　裕彦　栃木県足利市福富100番地
⑦1出願人　アキレス株式会社　東京都新宿区大京町22番地の5

明　細　書

1. 発明の名称

防滑性履物底の製造法

2. 特許請求の範囲

(1) 履物底の接地面に接着剤層を施し、該接着剤層に短繊維又は微細粒を静電植毛法により衝突させて固着させることを特徴とする防滑性履物底の製造法。

(2) 短繊維又は微細粒がプライマー処理を施されていることを特徴とする請求項(1)記載の防滑性履物底の製造法。

3. 発明の詳細な説明

〔産業上の利用分野〕

本発明は、防滑能を有する履物底の製造法に関する。

特に、本発明は、射出成形やスラッシュ成形により製造される履物底、とりわけポリ塩化ビニルなどの熱可塑性樹脂により製造される履物底に防滑能を付与させるようになした防滑性履物底の製造法に関する。

〔従来の技術〕

一般に、短靴、長靴、サンダルなどの履物底は、射出成形、スラッシュ成形などにより製造されている。

このような成形方法で、熱可塑性樹脂、例えばポリ塩化ビニルにより履物底を製造する場合、大量の可塑剤が用いられる。

この大量の可塑剤は、履物底製造後、その表面に徐々に浸出し、場合によっては表面に可塑剤の皮膜を形成する。

このように可塑剤の皮膜が履物底の接地面に形成されると、コンクリート面、金属面、タイル面、氷や雪による凍結面、あるいは水や油などに覆われた路面などで滑り易くなり、歩行しにくくする。

また、寒冷時においては、ポリ塩化ビニル自身の特性により硬度を増し、履物底の接地面と路面との摩擦係数が小さくなり、更に滑り易くなる。

このため、従来、履物底の接地面にゴムを貼着したり、金属製スパイクを埋設したり、あるいは履物底の接地面に凹凸模様(すなわち、凹凸意匠)

を形成するなどして、履物底に防滑機能を付与する工夫が種々行われていた。

しかし、ゴムを貼着する場合や凹凸意匠を形成する場合は、製造コストが高くなる割には、防滑機能が充分でない。また、金属製スパイクを使用する場合は、コストが高くなる上、コンクリート面、金属面、タイル面では却って滑り易くなるという問題があった。

このような問題を解決すべく、最近、例えば、特開昭６１－２２５３８０号公報に示されたように底面に短繊維や長繊維を植設して防滑機能を付与した履物底が提案されている。

〔発明が解決しようとする課題〕

しかしながら、上記公開公報に示された履物底は、ゴム等の材料中に短繊維を混合し、圧延し短繊維をずり応力方向に配向させてシート状にし、これを数枚重ねたものを繊維の配向方向に直交するように裁断し、この裁断面が防滑面となるようにモールドに充填し加硫成形して得られた底材の接地面をバフがけすることで、ゴム部分を削りとり短繊維先端を突出させるようにしたものである。しかしながら、バフがけによりゴム部分だけでなく、短繊維そのものも削し取ってしまいやすいので、バフがけ作業は技巧を要し、またバフがけの作業により粉じんが発生し作業場を汚染し、作業者の健康に影響を及ぼす不都合も生じ、また圧延された薄いシートを何枚も重ねあわせ裁断するという面倒な作業の必要から、製造上コスト高を来たし易いものであった。またその裁断面を接地面とすることから、その接地面は平面的な構成とせざるを得ず、したがって接地面に防滑性を有する凹凸意匠をあわせて付与することは困難であった。

本発明は、上述のような従来の不都合を解消した防滑性履物底の製造法を提供することを目的とするものである。

〔課題を解決するための手段〕

本発明は、前記の目的を達成するために、履物底の接地面に接着剤層を施し、該接着剤層に短繊維又は微細粒を静電植毛法により衝突させて固着させることを特徴とする防滑性履物底の製造法に関する。

本発明において、履物底は射出成形、スラッシュ成形、その他の成形法によりゴムやポリ塩化ビニル、ポリウレタン等の合成樹脂材料により成形されたもので、底部だけの単体の部品として成形されたものでもよいが、短靴にあっては、甲被部と一体に成形されたものでもよく、あるいは長靴にあっては、足を挿入する筒部や甲部と一体に成形されたものであってもよい。

この履物底の接地面は、平坦でもよいが、防滑性を与えるために凹凸模様を付与してもよく、この凹凸模様としては波形状や角錐、角錐台、円錐、円錐台、半球などの形状が採用され、通常の履物底の凹凸模様と同様にして履物底の全面または一部に形成される。

履物底の接地面には、その面が平坦な面であるか、凹凸模様面であるかにかかわりなく、短繊維を固着すべき面に接着剤を施こし、これに、静電植毛法により短繊維又は微細粒を衝突させて固着する。この短繊維又は微細粒としては、ガラス繊維、金属繊維、ナイロン，ケブラーなどの合成繊維、綿，麻，ウールなどの天然繊維、セラミック繊維あるいは木粉、あるいはゴムや硬質又は軟質合成樹脂成形体を粉細してなる微粉末、また、皮革粉やセラミック粉砕粒、あるいは、金属砂、硅砂等の砂などが挙げられる。

これらの短繊維又は微細粒は、必要によりプライマー処理（補強、硬化、接着性などを向上させることを目的とした繊維の薬剤による処理）をしたものであってもよい。

このプライマー処理に使用する薬剤としては、処理目的、短繊維又は微細粒の種類によって異なるが、一般には、例えばクロロプロピルトリメトキシシラン、グリシトキシプロピルトリメトキシシラン、メルカプトプロピルトリメトキシシランなどのシラン系カップリング剤を挙げることができる。

履物底の接地面に施こす接着剤としては、ポリエステル系ウレタン接着剤、ポリエーテル系ウレタン接着剤、ＮＲ系，クロロプレン系，ＮＢＲ系，ＳＢＲ系などのゴム系接着剤であって、溶剤系タイプと水系タイプとがあり、いずれのタイプも好ましく使用できる。

〔作　　用〕

本発明によれば、履物底の接地面に短繊維又は微細粒を固着植設する手段として、静電植毛法を用いたから、履物底は、従来公知の方法により成形されたあらゆる底材を適用し、また、すでに甲被や胴部と一体となった底材であってもそのまま適用し、これに静電植毛を施すことができ、植設の必要な個所へ部分的にでも全面的にでも、簡単に短繊維又は微細粒を固着植設することができ、

従来の接地面へのバフがけ作業のように繊維を残してゴム部のみをバフにより削り取るような作業者の熟練技術も不要の上、バフによる粉じん汚染もない。また、静電植毛法によるので、植設する部分が平坦であっても、また凹凸が形成されていても、ムラなく植設することができ、したがって、接地面に任意の凹凸模様からなる防滑意匠を施しておけば、植設された短繊維又は微細粒は、その凹凸模様の凹凸形状通りに固着植設されるので、製造された履物底は、短繊維又は微細粒による防滑効果と、凹凸模様からなる防滑意匠による防滑効果とが組み合わされた相乗的な防滑作用を奏することができる。

〔実　施　例〕

次に図を用いて本発明による実施例を示すが、本発明はこの実施例に限定されるものではない。

スラッシュ成形法によりＰＶＣを素材としたブーツ(1)を成形する。このブーツ(1)は胴部(2)と脚部(3)と履物底としての底部(4)とからなり、それらがすべて一体に無継目で成形されている。底部(4)は接地面(5)に任意の凹凸模様からなる防滑意匠(6)が施こされている。この底部(4)の接地面(5)に全面に亘って接着剤を施す。接着剤は、本実施例の場合、ポリエステル系ウレタン接着剤の溶剤系タイプを適用し、これをスプレー機を用いて該接地面(5)にスプレーして均一に塗布して薄い接着剤層(7)を形成した。この接着剤層(7)は防滑意匠(6)の凹部にも凸部にも施した。

この接着剤層(7)の塗布の後、本例ではガラス繊維からなる短繊維(8)を静電植毛法により、該接着剤層(7)に衝突させて、固着植設する。

静電植毛法によれば、短繊維(8)は、上記の接着剤層(7)塗布面（すなわち、防滑意匠(6)の凹部凸部の側壁面（６ａ）および上底面（６ｂ）、下底面（６ｃ）、踵部とふまず部との間の凹部面（６ｄ））に対し略垂直に植設される。

もっとも、微細な短繊維(8)の製造上の困難さから、実際には、直線状のもののみを用意することは不可能であり、曲がったものが混在してしまうのが一般的である。また、短繊維(8)が接着剤層(7)に衝突する際のタイミングにも若干のバラツキがある。このような事情から、短繊維(8)の全部が略垂直に植設されるとは限らない。但し、緻密な垂直の角度の度合を９０°とすると、バラツキなどを考慮した意味の略垂直としての９０°～７５°の範囲内の角度で植設された短繊維(8)の数の割合が全体の５０％以上、好ましくは６５％以上であるときは、前述の防滑作用は良好に発揮することを確認している。

更に、短繊維(8)は長さが不均一のものも使用できる。この場合、短繊維(8)のうちの比較的長い繊維の植設部周辺に繊維の不植設部が生じることがあり、該不植設部の縁部に短繊維のうちの比較的短かい繊維が垂直・斜めとランダムな方向に植設される現象が見られることがある。このような現象が生じても、上記の場合と同様に、緻密な垂直の角度の度合を９０°とすると、９０°～７５°の範囲内の角度で植設された短繊維(8)の数の割合が上記の範囲にあるならば前述の防滑作用は良好であることを確認している。

また、静電植毛時の条件は、植設する短繊維又は微細粒によって異なるが、一般には、１０～１００ｋＶ程度の電圧が必要である。

このようにして植設した後、短繊維又は微細粒の接着強度を高める必要があるときは、履物底(4)の接地面(5)全面に更に上記の接着剤をスプレー法やディッピング法などにより再度塗布する。

以上のようにして製造された履物底を有するブーツで冷凍庫内床面に形成した凹凸状の凍結面上を歩行したところ、良好な防滑機能を発揮した。

また、この凹凸状凍結面上に水を流して滑路面とし、この滑路面上を上記履物底を有するブーツで歩行しても、良好な防滑機能を発揮した。

〔発明の効果〕

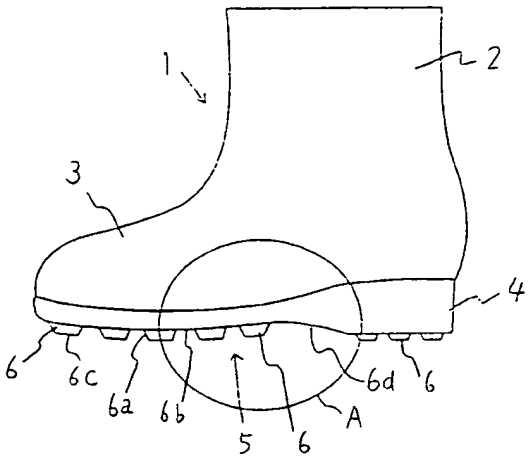
本発明においては、静電植毛法を用いるので、履物底の接地面に低コストで作業容易に作業場汚染もなく、短繊維又は微細粒を固着植設することができ、また接地面が平坦でも凹凸面でも関わりなく、また部分的にも全面的にも容易に固着植設することができる。したがって、接地面に凹凸模様の防滑意匠を施した上で更に短繊維又は微細粒を固着植設することができるので、防滑効果を更に相乗的に高めることができる。

4. 図面の簡単な説明

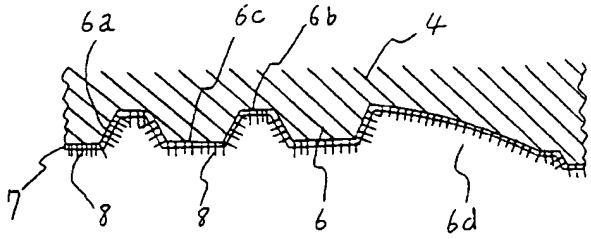
第１図は本発明の一実施例により得た履物底を有するブーツの側面図、第２図は第１図の部の拡大断面図である。

４・・・・・底　　部
５・・・・・接　地　面
６・・・・・防　滑　意　匠
７・・・・・接　着　剤　層
８・・・・・短　繊　維

第1図



第2図



(19) Japan Patent Office (JP)

(11) Unexamined Patent Application Publication

(12) Japanese Unexamined Patent Application Publication (A)

H3-170101

(51) Int. Cl.[5]		Identification symbols		Internal file number	(43) Publication date: 23 July 1991
A43B	10/00	101	C	6617–4F	
	13/22		B	6617–4F	
B05D	1/06			6122–4F	
// B32B	5/16			7016–4F	

Request for examination: Not filed Number of claims: 2 (4 pages total)

(54) Title of invention: Manufacturing method for antislip footwear soles

(21) Application: H1-311568

(22) Filing date: 30 November 1989

(72) Inventor: Kubota, Hirohiko, 100 Fukutomi, Ashikaga-shi, Tochigi-ken

(71) Applicant: Achilles Corporation, 22-5 Daikyo-cho, Shinjuku-ku, Tokyo

SPECIFICATION

1. *Title of invention*

Manufacturing method for antislip footwear soles

2. *Scope of patent claims*

(1) A manufacturing method for antislip footwear soles, distinguished in that an adhesive layer is applied to the ground contact surface of the footwear sole, and short fibers or fine particles are collided with said adhesive layer by electrostatic flocking to secure them thereto.

(2) A manufacturing method for antislip footwear soles as set forth in claim (1), distinguished in that the short fibers or fine particles are treated with primer.

3. *Detailed description of the invention*

(Field of industrial application)

The present invention relates to manufacturing methods for footwear soles having antislip characteristics.

In particular, the present invention relates to a manufacturing method for antislip footwear soles whereby antislip characteristics are imparted to the soles of footwear made by injection molding or slush molding, especially to the soles of footwear made from thermoplastic resins such as polyvinyl chloride.

(Prior art)

In general, the soles of footwear such as shoes, boots and sandals are made by injection molding, slush molding and the like.

When manufacturing footwear soles out of thermoplastic resin, for instance polyvinyl chloride, by such molding methods, large quantities of plasticizer are used.

These large quantities of plasticizers gradually seep out to the surface of the footwear sole after manufacturing, sometimes forming a plasticizer film over the surface.

If a plasticizer film is formed over the ground contact surface of a footwear sole in this manner, it makes it easy to slip on concrete surfaces, metal surface, tile surfaces, surfaces frozen with ice

and snow, path surfaces covered with water, oil, etc., and the like, making walking difficult.

Furthermore, when it is cold, polyvinyl chloride increases in hardness due to its own properties and the coefficient of friction between the ground contact surface of the footwear sole and the path surface decreases, making it even easier to slip.

Consequently, in the prior art, various means have been devised to impart antislip characteristics to the soles of footwear, such as gluing rubber to the ground contact surface of footwear soles, embedding metal spikes therein, or forming rugged patterns (*ie* rugged designs) on the ground contact surface of footwear soles.

However, when gluing rubber or forming a rugged design, the antislip characteristics are not adequate in relation to the increased manufacturing costs. Furthermore, when using metal spikes, there has been the problem that, in addition to the higher costs, it actually makes it easier to slip on concrete surfaces, metal surfaces and tile surfaces.

To resolve such problems, recently, footwear soles have been proposed to which antislip characteristics are imparted by flocking short fibers or long fibers onto the surface of the sole, as presented for instance in Japanese Unexamined Patent Application Publication S61-225380.

(Problem to be solved by the invention)

However, the footwear soles presented in the aforementioned Japanese Unexamined Patent Application Publication are made by mixing short fibers into a material such as rubber, and rolling it and arranging the short fibers in the direction of shear stress to form a sheet. Multiple plies of this are cut orthogonal to the direction in which the fibers are arranged, are filled into a mold such that this cut surface will become the antislip surface and are molded by vulcanization to obtain the sole material, the ground contact surface of which is buffed to remove the rubber part and cause the ends of the short fibers to protrude. However, buffing can easily remove not only the rubber part but also the short fibers themselves, so the buffing operation would require technical skill, and furthermore, the buffing operation would produce dust and contaminate the workplace, leading to the problem of adverse effects on the health of the workers, and moreover, could easily lead to high manufacturing costs due to the need for the troublesome operation of stacking and cutting multiple plies of rolled thin sheets. Furthermore, since the cut surface was made into the ground contact surface, that ground contact surface would have to be made into a planar configuration, thus making it difficult to at the same time apply a rugged design having antislip properties to the ground contact surface.

The objective of the present invention is to provide a manufacturing method for antislip footwear soles which resolves the problems of the prior art as described above.

(Means of solving the problem)

The present invention relates to a manufacturing method for antislip footwear soles distinguished in that, in order to achieve the aforesaid objective, an adhesive layer is applied to the ground contact surface of the footwear sole, and short fibers or fine particles are collided with said adhesive layer by electrostatic flocking to secure them thereto.

In the present invention, the footwear sole is molded from rubber or synthetic resin materials such as polyvinyl chloride or polyurethane by injection molding, slush molding or other molding methods, and while it may be molded as an individual component consisting only of the sole part, in the case of shoes, it may also be molded integrally with the instep part, or in the case of boots, it may also be molded integrally with the cylindrical part through which the foot is inserted and with the instep.

The ground contact surface of such a footwear sole may be flat, or it may be given a rugged pattern to provide antislip properties; for this rugged pattern, a wave shape or various shapes such as a pyramid, truncated pyramid, cone, truncated cone or sphere is used, and it is formed either over all or part of the footwear sole in the same manner as for the rugged pattern of conventional footwear soles.

Onto the ground contact surface of the footwear sole, regardless of whether it is a flat surface or a rugged surface, an adhesive is applied to the surface to which short fibers are to be secured. The short fibers or fine particles are collided with that surface by electrostatic flocking to secure

them thereto. These short fibers or fine particles include glass fibers, metal fibers, nylon, kevlar and other synthetic fibers, cotton, hemp, wool and other natural fibers and ceramic fibers, or fine powders made by powdering rubber or hard or soft synthetic resin molded products, as well as leather powder and crushed ceramic powder, or sands such as metal sand or quartz sand.

If necessary, these short fibers or fine particles may also be treated with primer (treated with chemical agents used on fibers for the purpose of strengthening, hardening and increasing adhesiveness and the like).

The chemical agents used in this primer treatment differ depending on the purpose of treatment and the type of short fiber or fine particles, but general examples include silane coupling agents such as chloropropyltrimethoxysilane, glycidoxypropyltrimethoxysilane and mercaptopropyltrimethoxysilane.

For the adhesive applied to the ground contact surface of the footwear sole, there are polyester urethane adhesives, polyether urethane adhesives, and NR, chloroprene, NBR, SBR and other rubber adhesives, including both solvent type and water type, either of which can be favorable used.

(Function)

According to the present invention, electrostatic flocking is used as the means of securing and flocking short fibers or fine particles onto the ground contact surface of the footwear sole, so for the footwear sole, it allows one to employ all sorts of sole materials molded by methods known in the prior art, as well directly employing sole materials that have already been formed integrally with the instep or tops, and to perform electrostatic flocking thereon to easily secure and flock short fibers or fine particles either partially onto areas which need to be flocked or over the entire surface, without the need for skilled technique on the part of the workers of the sort involved in conventional buffing of the ground contact surface, where the fibers are to be left behind and only the rubber part is to be removed by buffing, and without contamination by dust due to buffing. Furthermore, by using electrostatic flocking, it is possible to flock without irregularities regardless of whether the flocked area is flat or rugged, and thus, if an antislip design consisting of an arbitrary rugged pattern is formed in advance on the ground contact surface, the flocked short fibers or fine particles will be secured and flocked according to the rugged shaped of that rugged pattern, making it possible for the manufactured footwear sole to have a synergistic antislip effect combining the antislip effect due to the short fibers or fine particles with the antislip effect due to the antislip design consisting of a rugged pattern.

(Examples of embodiment)

Next, an example of embodiment according to the present invention is presented using drawings; the present invention is however not limited to this example of embodiment.

A boot is molded by slush molding using PVC as the raw material. This boot (1) consists of a top (2), an instep (3) and a sole (4) as the footwear sole, all of which are integrally and seamlessly molded. The sole (4) has an antislip design (6) consisting of an arbitrary rugged pattern applied to the ground contact surface (5). An adhesive is applied over the entirety of the ground contact surface (5) of the sole (4). For the adhesive, in the case of the present example of embodiment, a solvent type of polyester urethane adhesive is used, which is uniformly coated over said ground contact surface (5) by spraying using a sprayer to form a thin adhesive layer (7). This adhesive layer (7) is applied both to the concave and the convex parts of the antislip design (6).

After applying this adhesive layer (7), short fibers (8), which in the present example consist of glass fiber, are collided with said adhesive layer (7) by electrostatic flocking to secure and flock them thereon.

By using electrostatic flocking, the short fibers (8) are flocked substantially perpendicular to the surface onto which said adhesive layer (7) was applied (*ie*, the side wall surface (6a), upper bottom surface (6b) and lower bottom surface (6c) of the concave and convex parts of the antislip pattern (6) and the surfaces of the concave area (6d) between the heel and the shank).

However, due to difficulties in manufacturing of the fine short fibers (8), it is actually not possible to prepare only straight fibers, so bent ones will generally be found mixed among them. Furthermore, there is some dispersion in the timing with which the short fibers (8) collide with the

adhesive layer (7). Due to such circumstances, all the short fibers (8) will not necessarily be flocked in a substantially perpendicular manner. Now, assuming a strictly perpendicular angle is 90°, and taking the range of angles of 90° to 75° as being substantially perpendicular in a sense which takes into consideration dispersion and the like, it has been confirmed that the aforementioned antislip effect is favorably achieved when the proportion of the number of short fibers (8) flocked at an angle within said range is 50% or more of the total, or preferably, 65% or more.

Moreover, it is possible to use short fibers (8) of a non-uniform length. In this case, areas not flocked with fibers may appear at the periphery of areas flocked with the relatively longer ones of the short fibers (8), and the phenomenon may be observed whereby the relatively shorter ones of the short fibers (8) will be flocked perpendicularly, diagonally and in random directions at the edges of said non-flocked areas. Even if such a phenomenon occurs, just as in the case described above, it has been confirmed that, assuming a strictly perpendicular angle to be 90°, the aforesaid antislip effect is good so long as the proportion of short fibers (8) flocked at an angle ranging from 90° to 75° is within the aforesaid range.

Moreover, the electrostatic flocking conditions differ depending on the short fiber or fine particles being flocked, but generally require a voltage of about 10 to 100 kV.

After flocking in this manner, if there is a need to increase the strength of adhesion of the short fibers or fine particles, the aforementioned adhesive is again applied to the entirety of the ground contact surface (5) of the footwear sole (4) by spraying, dipping or the like.

Good antislip performance was exhibited when walking in boots having a footwear sole manufactured as described above on an uneven frozen surface formed over the floor inside a freezer.

Furthermore, even when a slippery path surface was made by spilling water over this uneven frozen surface, good antislip performance was exhibited when walking over this slippery path surface in boots having the aforementioned footwear sole.

(Effect of the invention)

In the present invention, by using electrostatic flocking, it is possible to secure and flock short fibers or fine particles onto the ground contact surface of footwear soles at low cost by a simple operation and without workplace contamination, regardless of whether the ground contact surface is a flat or rugged surface, and it is furthermore possible to easily secure and flock either partially or over an entire surface. Thus, it is possible to secure and flock short fibers or fine particles in addition to applying a rugged patterned antislip design onto the ground contact surface, thus allowing the antislip effect to be further increased synergistically.

4. *Brief description of the drawings*

Figure 1 is a side view of a boot having a footwear sole obtained according to an example of embodiment of the present invention; Figure 2 is an enlarged sectional view of Figure 1.

4 — Sole
5 — Ground contact surface
6 — Antislip design
7 — Adhesive layer
8 — Short fibers

Figure 1

[see source for drawing]

Figure 2

[see source for drawing]